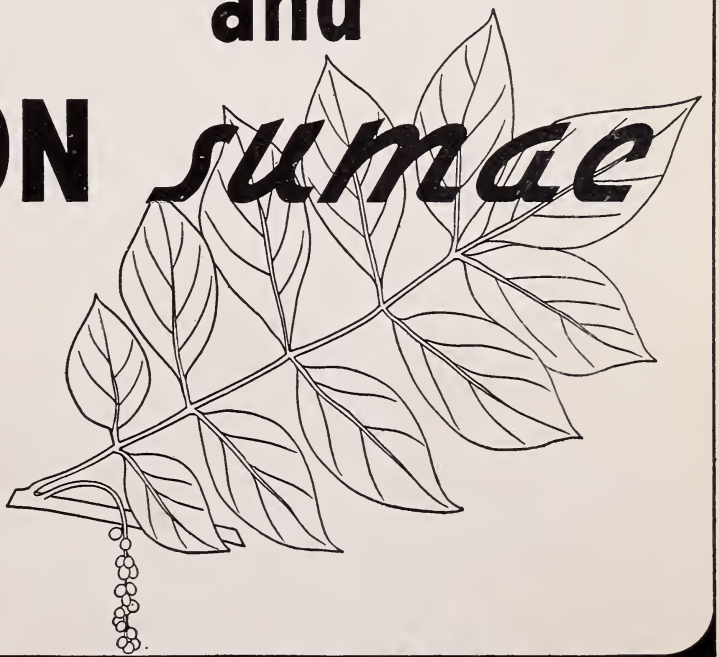
POISON-*ivy*

POISON-*oak*

and

POISON *sumac*



IDENTIFICATION
PRECAUTIONS
ERADICATION

•

Farmers' Bulletin No. 1972
U. S. DEPARTMENT OF AGRICULTURE

POISON-IVY, poison-oak, and poison sumac remind most people of painful experiences to be avoided, yet many do not know any one of the offending plants or their equally poisonous relatives. Learning to recognize them on sight is relatively easy, especially by examining the distinctive identifying characters described in the pictures and legends of this bulletin. There is then a good chance to avoid them or, if one must work among them, to take preventive measures to escape poisoning.

These plants are very common throughout the United States. They are found in fields and woods, along fence rows, rock walls, and hedges, in lawns and gardens, and even sometimes vining on houses. Usually in any one locality it is necessary to be certain of the identity of only two or three of them. Maps show at a glance where they are likely to be found. Frequent observation and recognition of the plants as they are encountered almost daily is the best way to become poison-oak or poison-ivy conscious. Nonpoisonous sumacs are easily distinguished from the poisonous species by the seed heads and leaves.

The old proverb, "an ounce of prevention is worth a pound of cure," is good advice to everyone, particularly as regards ivy poisoning. Previous escape is not proof of immunity when conditions are right, and after poisoning occurs there is no quick cure known. Some relief may be obtained and recovery hastened by use of some of the tested remedies. In case of severe poisoning a physician should be consulted.

Poison-ivy and other poisonous plants growing in grounds frequented by people should be eradicated. In some places this can be done by careful grubbing. In others weed-killing chemicals may be better and more certainly would avert poisoning for most of us.

This bulletin supersedes Farmers' Bulletin 1166, Poison Ivy and Poison Sumac and Their Eradication.

Washington, D. C.

Issued August 1945
Slightly revised, May 1946

POISON-IVY, POISON-OAK, AND POISON SUMAC: IDENTIFICATION, PRECAUTIONS, ERADICATION

By Donald M. Crooks, *principal horticulturist, Division of Tobacco, Medicinal, and Special Crops, and* Leonard W. Kephart, *senior agronomist, Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration*

Contents

A WIDESPREAD MENACE TO HEALTH

EVERY year sees many adults, and especially children, accidentally poisoned from contact with plants that they did not know were harmful. Had the sufferers known how to detect poisonous plants they could have avoided them and escaped the painful experience of severe skin inflammations and water blisters. Very few persons have a sufficient degree of immunity to protect them from poisonous plants, and many do not recognize them in the various forms that they assume in different parts of the country.

One or more kinds of poison-ivy—common poison-ivy, oakleaf poison-ivy, and western poison-oak—occur in abundance in almost every part of the United States. Poison sumac is of more limited distribution and occurs chiefly east of the Mississippi River, usually in swampy regions.

Poisoning by these plants is largely preventable. A knowledge sufficient to identify them in their various forms is easily gained by anyone who will make a study of pictures and general descriptions and train himself by a little diligent practice to observe the plants in his locality. It is important to become poison-oak or poison-ivy conscious. This can be accomplished only by learning to know the plants by repeated experience in observing them in their various forms. Persons who learn both to know and to avoid the plants can save themselves much inconvenience and discomfort. The simple means of learning to recognize them will pay big dividends. It is the first step to the prevention of poisoning and to the eradication of the pests from private grounds and public places.

The most effective method of prevention is to eradicate the plants, and wherever possible this should be done. They should not be allowed to grow in lawns or gardens, with ornamental shrubbery, or on houses. Communities should not countenance the growth of poison-ivy or poison-oak in school grounds, on public roadways, or in parks, especially those frequented by children. The cost of medical aid for one season in treating pupils using an ivy-infested schoolyard is likely to be more than that of eradicating the plants, to say nothing of the suffering and inconvenience they may cause.

FORMS OF POISON-IVY AND POISON-OAK

Poison-ivy and poison-oak are known by a number of local names, and several different kinds of plants are called by these names. The plants exhibit a good deal of variation throughout the United States, so much so that even technical botanists cannot agree on the number of species and names that should be applied to them. They grow in the form of (1) woody vines attached to trees or objects for support, (2) trailing shrubs mostly on the ground, or (3) erect woody shrubs entirely without support. They may flourish in the deep woods, where soil moisture is plentiful, or they may be found in very dry soil on the most exposed hillsides. The plants are most frequently abundant along old fence rows and edges of paths and roadways, and they ramble over rock walls and climb posts or trees to considerable heights. They often grow with other shrubs or vines in such ways as to escape notice.

The leaf forms among plants or even on the same plant are as variable as the habit of growth; however, the leaves always consist of three leaflets. The old saying, "Leaflets three, let it be," is a reminder of this consistent leaf character but may lead to undue suspicion of some harmless plant. Only one three-parted leaf leads off from each node on the stem. The leaves never occur in pairs along the stem. The wide range in habit of growth of plants and leaf types may be noted from a glance at the several pictures of plants and leaves.

The flowers and fruit are always in clusters on slender stems that originate in the axis of the leaves along the side of the smaller branches. The fruits usually have a white, waxy appearance and ordinarily are not hairy, but may be so in some forms. The plants do not always flower and bear fruit. The white or cream-colored clusters of fruit, when they occur, are significant identifying characters, especially at the season after the leaves have fallen.

For convenience, these plants are discussed in this bulletin under three divisions: (1) Common poison-ivy, (2) oakleaf poison-ivy, and (3) western poison-oak. A technical botanist would recognize many species of plants in what are included as the common poison-ivy, and anyone will recognize that various forms occur within this grouping.

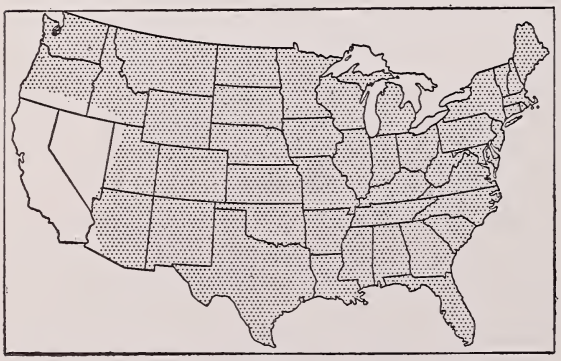


***Figure 1.*—The shaded part shows the extensive area where some form of the common poison-ivy is likely to be found. Other forms also may occur in parts of the same region.**

COMMON POISON-IVY

Some form of the common poison-ivy may be found in almost every part of the country but the extreme West. The shaded area on the map in figure 1 shows the extensive range where some form of poison-ivy is likely to be found. The plant is known by various local names—poison-ivy, threeleaf ivy, poison creeper, climbing sumac,

Figure 2.—Large poison-ivy vine growing on a tree for support. This is the usual form of the common poison-ivy in wooded areas.

Figure 3.—*A*, **Common poison-ivy growing in a hedge and on a shade tree on the edge of a lawn.** *B*, **Typical vine, showing leaves and the roots that attach it to the tree.**

poison-oak, markweed, picry, and mercury. The most widespread form is classified by botanists under the botanical name of *Rhus radicans* or varieties of it; however, many of the variations are sometimes given other botanical names. The common poison-ivy may be considered as a vine in its most typical growth habit.

The vining type most often occurs in wooded areas (fig. 2), where it depends upon trees for support. Vines often grow for many years, becoming several inches in diameter and quite woody. Slender vines may run along the ground, mixed with shrubbery, or take support from a large or small tree. That a plant growing along the edge of a lawn and into the shrubbery may be quite inconspicuous as compared with a vine climbing on a lawn tree is shown in figure 3. The vine readily develops roots when in contact with the ground or with any object that will support it. When the vines grow on trees these aerial roots attach the vine securely (fig. 3, *B*). A rank growth of these roots often causes the vines on trees to have the general appearance of a "fuzzy" rope, which sometimes serves a good purpose for identification. The vines and roots apparently do not cause injury to the tree except where growth may be sufficient to cover the supporting plant and exclude sunlight or break the plant from excessive weight. The vining nature of the plant makes it well adapted to climbing over stone walls or on brick and stone houses.

The fact that poison-ivy often becomes mixed in with ornamental shrubbery and vines often results in its cultivation as an ornamental vine by people who do not recognize the plant. An ivy plant growing on a house, as is shown in figure 4, is often prized by an unsuspecting owner. The vine is attractive and quite effective as an ornamental, but such use should not be tolerated, as it most certainly will result in cases of accidental poisoning and serve as propagating stock for more poison-ivy in the vicinity.

When poison-ivy becomes mixed in with other vines it is quite difficult to detect except by one who has carefully trained himself in observing and recognizing the plant. Also, some other vines and young plants resemble poison-ivy in many respects. The Virginia creeper and some forms of the Boston ivy are often confused with it. The Virginia creeper can always be recognized by its five leaflets radiating from one point of attachment, as compared with the three leaflets of poison-ivy arranged in the same manner. The Boston ivy with three leaflets is sometimes difficult to detect; however, as a

Figure 4.—**Common poison-ivy growing on side of house with ornamental shrubs. This accidental or intentional use of the attractive vine may lead to many cases of accidental poisoning.**

Figure 5.—**Common poison-ivy growing along fence row. In open sunlight and over some large areas it is more of a shrub than a vine.**

Figure 8.—**Common poison-ivy, about natural size: *A*, Flowers; *B*, mature fruit.**

figure 6, *D*, and one with leaflets having slightly lobed margins is shown in figure 6, *E*. The other forms shown in figure 6 are not quite so widespread, but may be the usual type throughout some areas.

Most of the vines or shrubs of poison-ivy produce some flowers that are always in clusters arising on the side of the stem immediately above a leaf. The flowers are rather inconspicuous among the leaves, as may be noted in figure 7, but they are in quite distinct clusters, as shown in figure 8, *A*. Frequently the flowers do not develop or are abortive and no fruit is produced. When fruits do develop they serve as a positive way of identifying the plant. The berries are not easily confused with the fruits of other plants. They are white and waxy in appearance and have rather distinct lines marking the outer surface, as the segments appear in a peeled orange. These lines may be noted in figure 8, *B*, which shows dense clusters of mature fruit about natural size. Some forms of the poison-ivy have the fruit covered with fine hair, giving it a kind of downy appearance; however, in the more common form the fruits are entirely smooth. The fruit is especially helpful in identifying plants late in fall, in winter, and early in spring, when the leaves are not present.

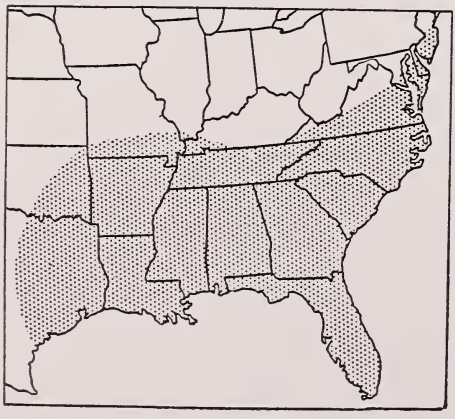


Figure 9.—**The shaded area is the region where the eastern oakleaf form of poison-ivy is likely to occur. Other forms also may be in the same region.**

OAKLEAF POISON-IVY

Of the several kinds of poison-ivy, the oakleaf form occurring in the Eastern and Southern States is more distinctive than some other types. Some people know it as oakleaf ivy while others call it poison-oak, a name more commonly used for the western species discussed later. Botanists have not always agreed upon the scientific name to be applied to this form; however, they now use the name *Rhus toxicodendron*. Some botanists have used the Latin names *R. quercifolia*, while others used the name *Toxicodendron quercifolium*, both of which are more descriptive of the oakleaf form, as the generic name of the oak is *Quercus*. The area where the oakleaf form may occur, from New Jersey to Texas, is outlined in the map shown in figure 9. The common poison-ivy also occurs in some form throughout many parts of this same area.

Figure 10.—**Eastern oakleaf poison-ivy shrub. The upright growth as a low shrub is common. The three parts of each leaf somewhat resemble an oak leaf. The gall formations that cause wartlike protuberances are common on all species.**

The oakleaf poison-ivy usually does not climb as a vine, but occurs as a low-growing shrub. Stems are usually upright in their general growth habit, as they appear in figure 10. The shrubs usually have rather slender branches, often covered with a fine pubescence that gives the plant a kind of downy appearance. The leaflets occur in threes, as in other ivy, but are lobed, somewhat on the general plan of the leaves of some kinds of oak. The middle leaflet usually is lobed somewhat alike on both margins and very much resembles a small oak leaf, while the two lateral leaflets are often irregularly lobed. The leaves shown in figure 11 are a common form. The lighter color on the under side of one of the leaves (fig. 11, *A*) is due to the pubescence, or fine hairs, on the surface. The range in size of leaves varies considerably, even on the same plant; the leaf shown in figure 11, *B*, however, is about natural size.

The fruit of oakleaf poison-ivy has the same general appearance as the fruit of common poison-ivy shown in figure 8, although the individual fruits and stems are often pubescent, while most of the other forms have a waxy, smooth, cream-colored fruit.

WESTERN POISON-OAK

The western poison-oak *(Rhus diversiloba)* of the Pacific Coast States is usually known as poison-oak, but is occasionally referred

Figure 11.—Eastern oakleaf poison-ivy: *A*, Leaves, showing upper deep green surface and lower lighter colored surface. *B*, Single leaf, about natural size. The terminal leaflet more nearly resembles an oak leaf than the two lateral leaflets.

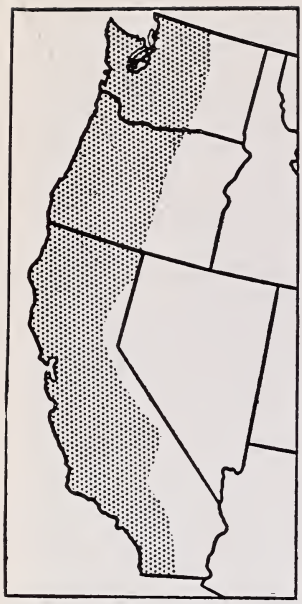


Figure 12.—**The shaded area is the region where the western poison-oak is likely to occur. Other forms may also be in the same region.**

to as poison-ivy or yeara. It is likely to be found in the region designated by shading in figure 12, and from central Oregon northward through Washington may be growing intermixed with common poison-ivy. The term "poison-oak" is a misnomer, as this species is in no way related to the oak but is related to poison-ivy. Anyone familiar with either of these plants in their several forms will likely recognize the other, both as plants to be avoided.

The most common growth habit of the western poison-oak is in the form of a rank upright shrub with many small woody stems rising from the ground. It frequently grows in great abundance along roadsides (see fig. 16) and in uncultivated fields or on abandoned land.

Sometimes western poison-oak attaches itself to upright objects for support and takes more or less the form of a vine. A plant of this type is shown in figure 13, where it is growing on a telephone pole by the roadside. It may be noted even in this case that the tendency is for individual branches to continue an upright growth rather than become entirely dependent upon other objects for support. In some areas, especially in woodland, poison-oak may grow principally as a vine. Areas have been noted where 70 to 80 percent of the trees

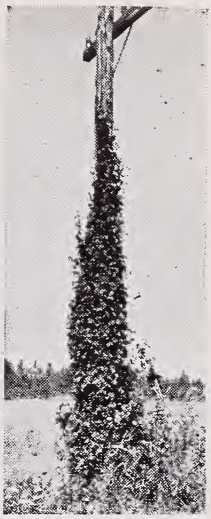


Figure 13. — **Western poison-oak on a telephone pole. This vine form is not uncommon, especially on trees in woods.**

Figure 14.—**Western poison-oak: Upright shrub, with fruit, growing in open pasture field.**

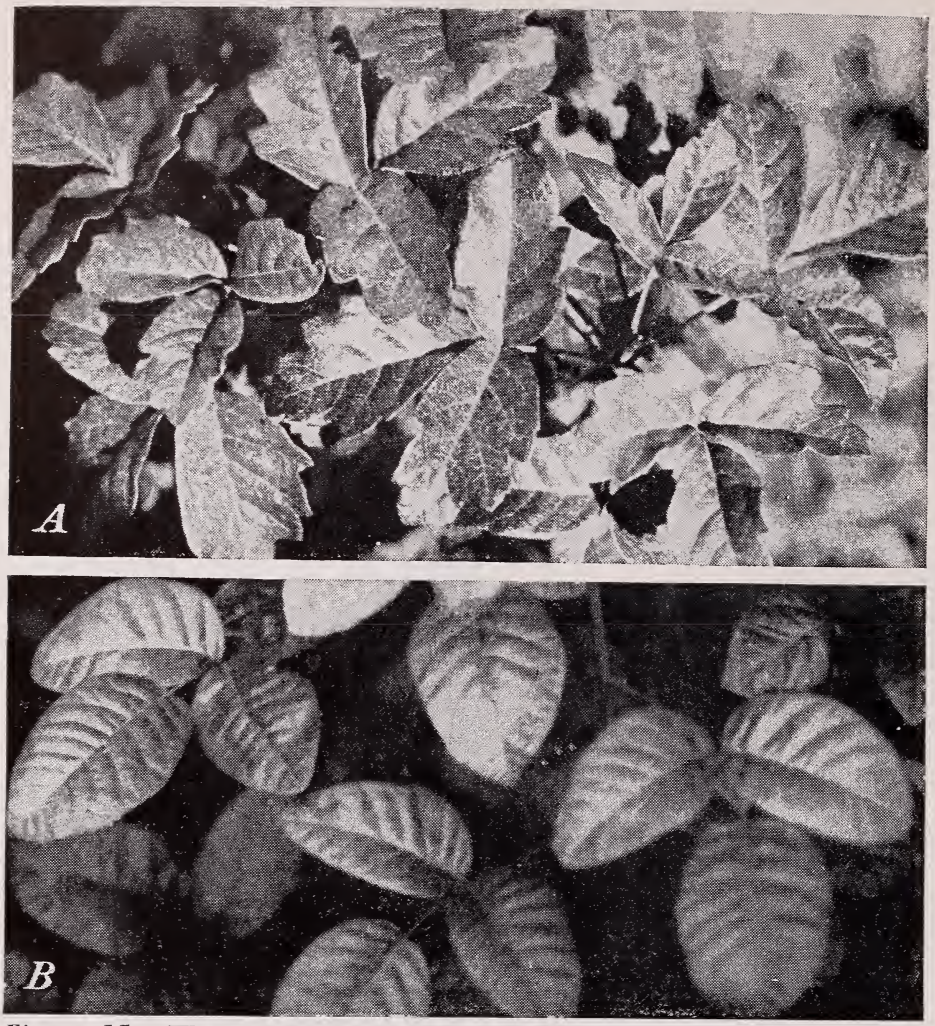


Figure 15.—Western poison-oak, showing common leaf types: *A*, The more common leaves with irregular margins; *B*, less typical, although not uncommon, leaves with even margins.

Figure 16.—Western poison-oak growing along roadside. This rank shrubby growth is typical for most localities.

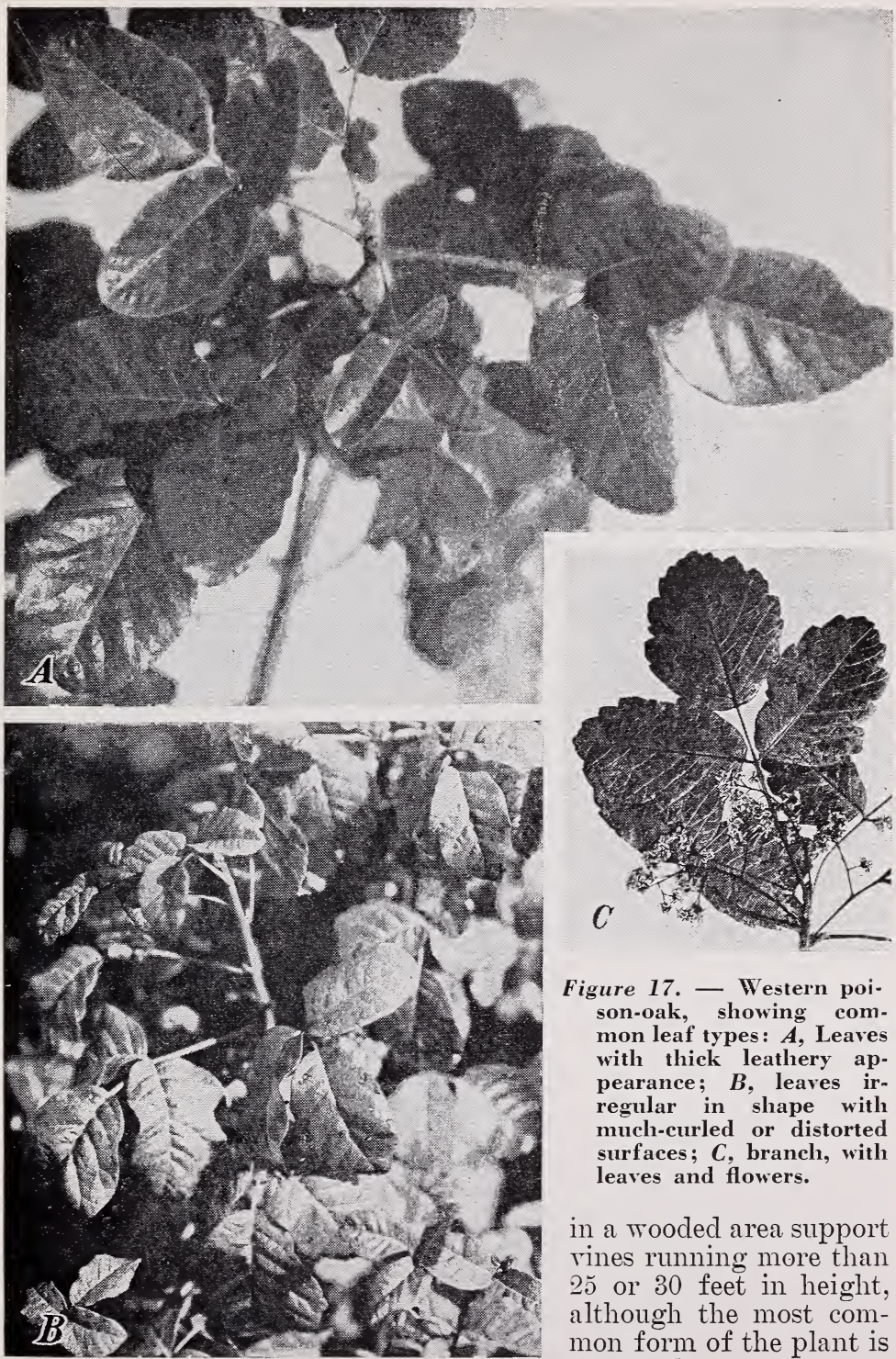


Figure 17. — **Western poison-oak, showing common leaf types: *A*, Leaves with thick leathery appearance; *B*, leaves irregular in shape with much-curled or distorted surfaces; *C*, branch, with leaves and flowers.**

in a wooded area support vines running more than 25 or 30 feet in height, although the most common form of the plant is the shrub.

In open pasture fields western poison-oak usually grows in spreading clumps from a few feet to several feet tall (figs. 14 and 16). Where it develops extensively it greatly reduces the area for grazing and becomes a serious menace to most people who frequent the area or attend cattle that come in contact with the plants while grazing.

***Figure 18.*—Western poison-oak: *A*, Top of shrub, with leaves and fruit; *B*, clusters of fruit after leaves have fallen.**

Low-growing plants, especially those exposed to full sunlight, are often quite woody and show no tendency for vining. Low-growing plants with woody stems are common in pasture areas or along roadsides. Livestock in grazing do not invade the poison-ivy shrub, and as a rule these plants continue to spread both by rootstock and seed.

As in other ivy the leaves consist of three leaflets with much irregularity in the manner of lobing, especially of the two lateral leaflets. The Latin name *diversiloba* refers to the irregularity occurring in the shapes of the leaves on different plants and on the same plant or even irregularity in the lobing of leaflets of the same leaf. Sometimes lobes occur on both sides of a leaflet, thus giving it somewhat the semblance of an oak leaf. The middle or terminal leaflet is more likely to be lobed on both sides and resembles an oak leaf more than the other two. A study of the leaves shown in figures 15 and 17 shows the variation in lobing. Some plants may have leaflets with an even margin and no lobing

whatsoever, as those in figure 15, *B*. The surface of the leaves is usually glossy and uneven, so that they have a thick leathery appearance.

The flowers are borne in clusters on slender stems diverging from the axis of the leaf, as may be noted in figure 17, *C*. The individual flowers are greenish white and about one-fourth inch across. The cluster of flowers matures into greenish or creamy-white berrylike fruits about mid-October. These are about the size of small currants

***Figure 19.*—A large poison sumac shrub about 15 feet tall, growing on the edge of a swamp.**

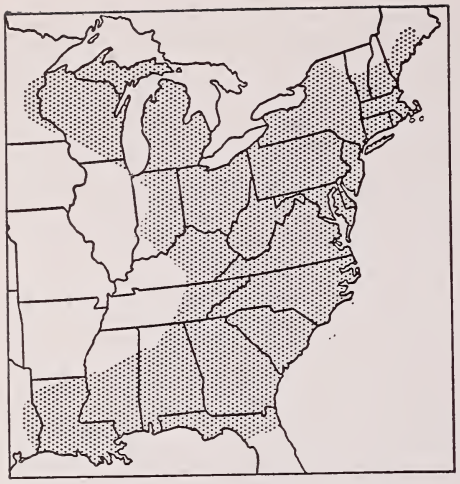


Figure 20.—**The shaded area shows the region where poison sumac is likely to occur in bogs or swamps, although isolated plants are sometimes found in dry soil.**

and are much like other poison-ivy fruits, having a smooth greenish-white glossy surface striped somewhat like the segments of a peeled orange. Many plants bear no fruit, although others produce it in abundance, as shown in figure 18, *A*. The fruits are not always spherical, but sometimes have a somewhat flattened appearance, as is shown in figure 18, *B*. They remain on the plants throughout fall and winter and are quite helpful in identifying poison-oak in seasons after the leaves have fallen.

POISON SUMAC

Poison sumac grows as a coarse woody shrub or small tree (fig. 19) and never in the vinelike form of its poison-ivy relatives. This plant is known also as swamp sumac, poison elder, poison ash, poison dogwood, and thunderwood. It does not have variable forms, such as occur in poison-oak or poison-ivy, and botanists agree to call it *Rhus vernix*. The area in the Eastern States where it is likely to be

Figure 21.—**Small branch of poison sumac with six compound leaves.**

found is chiefly eastward from eastern Minnesota, northeastern Illinois, Indiana, central Kentucky and Tennessee, and southeastern Texas, as shown on the shaded area of the map, figure 20. This shrub is usually associated with swamps and bogs, and the most typical growth occurs along the margin of an area of wet acid soil.

Figure 22.—**Fruit of poison sumac, one-third natural size. These fruits somewhat resemble those of poison-ivy. They are always on drooping slender stems attached at the side of the small branches and are never terminal as in the species of sumac that are not poisonous.**

The plants range in height from 5 or 6 feet to small trees that may attain a height of 25 feet. The poison sumac shrub shown in figure 19 is growing on the edge of a swamp and is quite typical of the general appearance of the larger shrubs, which approach a treelike form. As a rule the shrubs do not have a symmetrical upright treelike appearance. They are more or less inclined to lean and have branched stems with about the same diameter from the ground level to the middle height of the shrub.

Occasional isolated plants are found outside of swampy regions. Apparently these plants are started from seed distributed by birds. The plants in dry soil usually do not become more than a few feet tall. They are likely to cause poisoning to unsuspecting individuals, as single isolated plants are not readily recognized, especially out of their usual region.

The leaves of the poison sumac are divided into 7 to 13 leaflets, arranged in pairs with a single leaflet at the end of the midrib (fig. 21).

Figure 23.—A, **Smooth sumac and dwarf sumac growing in a mixed stand. These plants are not poisonous.** ***B,*** **Terminal fruiting spike of smooth sumac, about one-seventh natural size. This form of terminal fruiting spike is typical of all the species of sumac that are not poisonous.**

The leaflets are an elongated oval shape without teeth or serrations on the margins. They are 3 to 4 inches long and 1 to 2 inches wide, with a smooth velvetlike texture and bright orange color when they first appear in spring. Later they become dark green and glossy on the upper surface and pale green on the lower and have scarlet midribs. Early in fall they turn to a brilliant red-orange or russet shade.

The small yellowish-green flowers are borne in clusters in slender stems arising from the axis of leaves along the smaller branches. The slender clusters of flowers have much the general appearance of the poison-ivy flower, but hang in much longer clusters. The flowers mature into ivory-white or green-colored fruits resembling those of poison-oak or poison-ivy, except that they are usually less compact and hang in loose clusters that may be 10 to 12 inches in length (fig. 22).

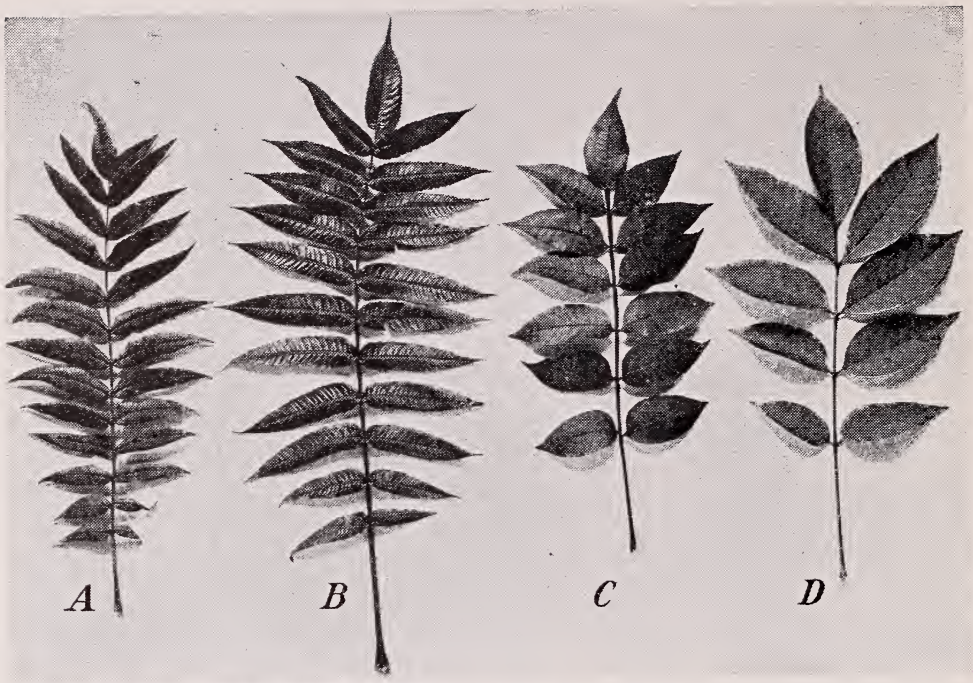
CONFUSION OF POISONOUS AND HARMLESS SUMACS

Because of the same general appearance of several common species of sumac and the poison sumac, considerable confusion has occurred as to which one is poisonous. Throughout most of the range where poison sumac grows, three other species are the only ones that are likely to be confused. These are the smooth sumac (*Rhus glabra*), staghorn sumac (*R. typhina*), and dwarf sumac (*R. copallina*). All the nonpoisonous species have red fruits that together form a distinctive terminal seed head, as shown in figure 23. These are easily distinguished from the slender hanging clusters of white fruit of the poison sumac, as shown in figure 22. Sometimes more than one species of the harmless sumac grow together, as shown in figure 23, *A*.

When seed heads or flower heads occur on the plants it is easy to distinguish the poisonous from the harmless plants; however, in many clumps of either kind, flowers or fruit may not develop. Fortunately, the leaves have some rather distinct characteristics, which can be easily observed. Figure 24 shows leaves of the three harmless species as compared with poison sumac.

The leaves of the smooth sumac (fig. 24, *A*) and of the staghorn sumac (fig. 24, *B*) have many leaflets, which are slender lance-shaped with a toothed margin. In these species there are usually more than 13 leaflets. The leaves of the dwarf sumac (fig. 24, *C*) and the poison sumac (fig. 24, *D*) have fewer leaflets, and these are more oval-shaped, with smooth or even margins.

The dwarf sumac, however, may be readily distinguished from the poisonous sumac by the winged midrib of the leaf (fig. 24, *E*). There is considerable variation in the size of the wing margin along the midrib, which in some cases may be reduced almost to a line between the leaflets. The winged midrib is more prominent near the terminal leaflet and can always be detected. The midrib of the poison sumac is never winged. A little study of the fruit and the leaf characteristics of the poisonous and harmless species will make it possible to avoid the poisonous one and utilize the other, which has considerable value as an ornamental plant, as a source of commercial tannin, and for controlling erosion on waste hillsides.



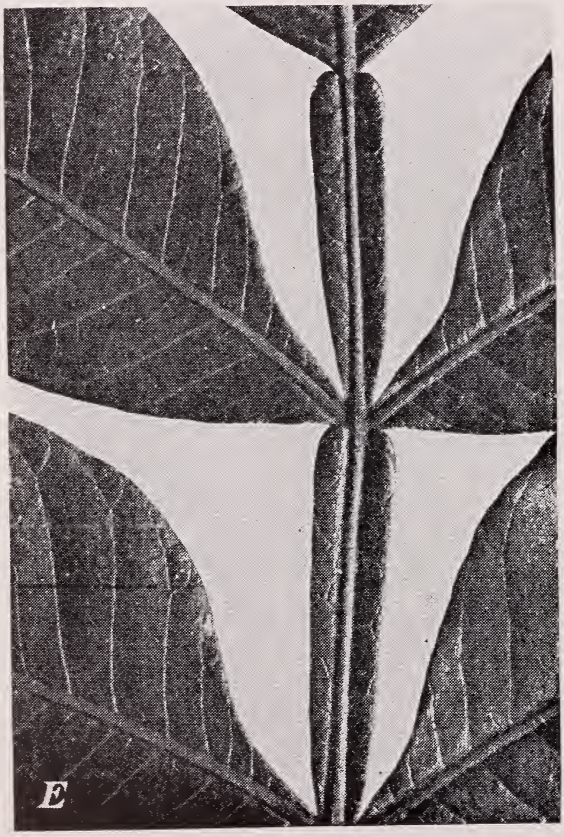


Figure 24.—Leaves of species of sumac that are often confused: *A*, Smooth sumac; *B*, staghorn sumac; *C*, dwarf sumac; *D*, poison sumac; *E*, enlarged portion of dwarf sumac leaf from *C*, showing the wing margin of the midrib. Poison sumac does not have the winged midrib.

INTRODUCED POISONOUS SUMAC AND RELATED SPECIES

The small Japanese lacquer-tree, although uncommon in the United States, is an introduced species of sumac (*Rhus verniciflua*) that is quite similar to the native poison sumac. It is native to Japan and China and is the source of Japanese black lacquer. Cases of poisoning have been traced to contact with lacquered articles. Because of its poisonous properties, this tree should never be planted.

A native shrub or small tree called poison-wood, doctor gum, or coral sumac is commonly found in the pinelands and hummocks of extreme southern Florida, the Keys, and the West Indies. It is much like the poison sumac and closely related to it. Most botanists name it *Metopium toxiferum*, although previously it was named *Rhus metopium*, and sometimes metopium is used as its common name. The small tree, or shrub, has the same general appearance as poison sumac. The leaves have the same general appearance, except that there are usually only three to seven leaflets, which are more rounded. The fruits are borne in clusters in the same manner as those of poison sumac (fig. 22), but individual fruits are two or three times as large and orange-colored. All parts of the plant are exceedingly poisonous to the touch and cause the same kind of skin irritation as poison-ivy or poison sumac.

POISONING

Through experience, many people know that they are susceptible to poisoning by poison-ivy, poison-oak, or poison sumac, while some others either have escaped contamination or have a certain degree of immunity. The extent of immunity appears only relative, and absolute immunity to the toxic principle apparently does not exist. Persons who have shown a degree of immunity upon repeated contact with the plants may develop poisoning on subsequent exposure.

The skin irritant of poison-ivy, poison-oak, and poison sumac is the same toxic agent. It is a nonvolatile phenolic substance called urushiol and is found in all parts of the plant, including roots and fruit. It occurs in great abundance in the plant sap. The danger of poisoning is greatest in spring and summer, when the sap is abundant, and least late in fall or in winter.

Poisoning is usually caused by contact with some part of the plant. A very small quantity of the poisonous substance is capable of producing severe inflammation of the skin and can easily be transferred from one object to another. Clothing may become contaminated and is often a source of such prolonged infection that it is likely to be judged as a case of poisoning difficult to cure. Dogs and cats frequently touch the plants and transmit the poison to unsuspecting persons. The poison may remain on the fur of animals for a considerable period after they have walked or run through poison-ivy plants. Smoke from burning plants will carry the toxin and has been reported to cause severe cases of poisoning. Cases of poisoning of children from eating the fruit have been reported. A local belief that eating a few leaves of these plants will develop immunity in the individual is unfounded. It never should be attempted. No part of the plant should ever be taken internally, as it is a violent irritant and poisonous to man.

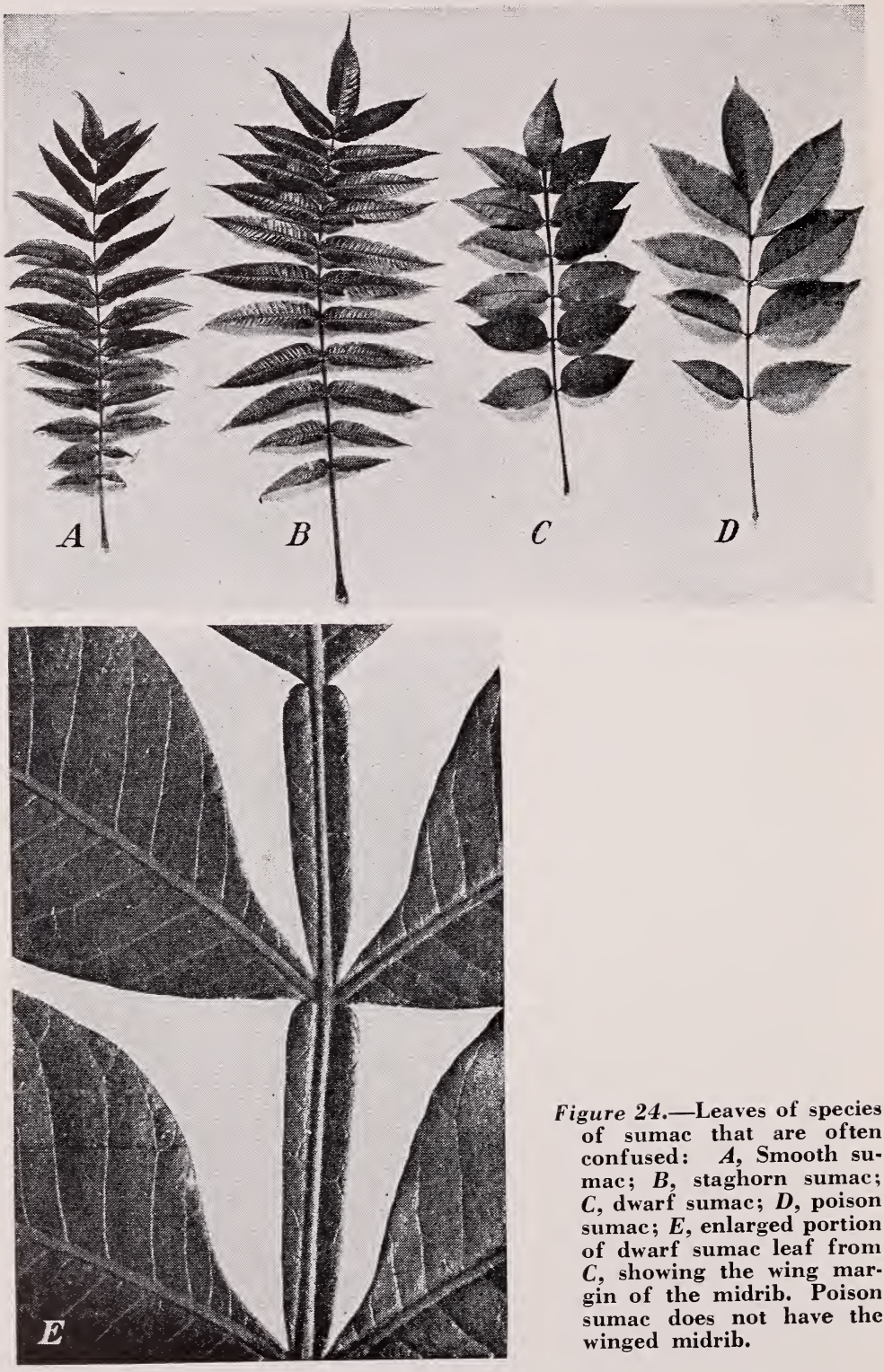


Figure 24.—Leaves of species of sumac that are often confused: *A*, Smooth sumac; *B*, staghorn sumac; *C*, dwarf sumac; *D*, poison sumac; *E*, enlarged portion of dwarf sumac leaf from *C*, showing the wing margin of the midrib. Poison sumac does not have the winged midrib.

The small Japanese lacquer-tree, although uncommon in the United States, is an introduced species of sumac (*Rhus verniciflua*) that is quite similar to the native poison sumac. It is native to Japan and China and is the source of Japanese black lacquer. Cases of poisoning have been traced to contact with lacquered articles. Because of its poisonous properties, this tree should never be planted.

A native shrub or small tree called poison-wood, doctor gum, or coral sumac is commonly found in the pinelands and hummocks of extreme southern Florida, the Keys, and the West Indies. It is much like the poison sumac and closely related to it. Most botanists name it *Metopium toxiferum*, although previously it was named *Rhus metopium*, and sometimes metopium is used as its common name. The small tree, or shrub, has the same general appearance as poison sumac. The leaves have the same general appearance, except that there are usually only three to seven leaflets, which are more rounded. The fruits are borne in clusters in the same manner as those of poison sumac (fig. 22), but individual fruits are two or three times as large and orange-colored. All parts of the plant are exceedingly poisonous to the touch and cause the same kind of skin irritation as poison-ivy or poison sumac.

POISONING

Through experience, many people know that they are susceptible to poisoning by poison-ivy, poison-oak, or poison sumac, while some others either have escaped contamination or have a certain degree of immunity. The extent of immunity appears only relative, and absolute immunity to the toxic principle apparently does not exist. Persons who have shown a degree of immunity upon repeated contact with the plants may develop poisoning on subsequent exposure.

The skin irritant of poison-ivy, poison-oak, and poison sumac is the same toxic agent. It is a nonvolatile phenolic substance called urushiol and is found in all parts of the plant, including roots and fruit. It occurs in great abundance in the plant sap. The danger of poisoning is greatest in spring and summer, when the sap is abundant, and least late in fall or in winter.

Poisoning is usually caused by contact with some part of the plant. A very small quantity of the poisonous substance is capable of producing severe inflammation of the skin and can easily be transferred from one object to another. Clothing may become contaminated and is often a source of such prolonged infection that it is likely to be judged as a case of poisoning difficult to cure. Dogs and cats frequently touch the plants and transmit the poison to unsuspecting persons. The poison may remain on the fur of animals for a considerable period after they have walked or run through poison-ivy plants. Smoke from burning plants will carry the toxin and has been reported to cause severe cases of poisoning. Cases of poisoning of children from eating the fruit have been reported. A local belief that eating a few leaves of these plants will develop immunity in the individual is unfounded. It never should be attempted. No part of the plant should ever be taken internally, as it is a violent irritant and poisonous to man.

Cattle, horses, sheep, hogs, and other livestock apparently do not suffer from skin irritation caused by these plants, although they have been observed to graze upon the foliage occasionally. Bees collect honey from the flowers, though no reports are on record of any ill effects from the use of the honey.

The time between contamination of the skin and the first symptoms varies greatly with individuals and probably with conditions. The first symptoms of itching or burning sensation may develop in a few hours or after 5 days or even more. The delay in development of symptoms is often confusing in attempting to determine the time or location when contamination occurred. The itching sensation and subsequent inflammation, which usually develops into water blisters under the skin, may continue for several days from a single contamination. Persistence of symptoms over a long period is likely to be due to new contacts with plants or with previously contaminated clothing or animals. Severe infection may produce more serious symptoms, which result in much pain through abscesses, enlarged glands, fever, or complicated constitutional malfunction. Secondary infections are always a possibility in any break in the skin, such as is produced by breaking vesicles that have formed as large water blisters.

PRECAUTIONS AGAINST POISONING

The most effective way to prevent poisoning from the plants is to avoid contact with them. If it is necessary to work among them, some measure of prevention can be gained by wearing protective clothing, but it is necessary to remember that the active poisonous principle can easily be transferred. Some protection also may be obtained in advance by the use of protective creams or lotions. They prevent the poison from touching the skin, or make the active principle easily removed, or neutralize it to a certain degree.

Various formulas containing ferric chloride and glycerin have been used more or less effectively as a preventive measure, although there may be some danger of pigmentation of the skin from the ferric chloride. A common formula is ferric chloride, 5 parts; glycerin, 25 parts; alcohol, 25 parts; water, 50 parts.

A lotion of this formula applied to the exposed skin prior to contact with poisonous plants gives effective protection for many people. It is especially effective if followed by thorough washing with soap and water. Such washing, even if no protective lotion has been used, is often effective in preventing poisoning. Proper precaution should be taken by repeated lathering with a strong alkali soap, followed by thorough rinsing and repeating the process several times. The water should be frequently changed, and a shower or flowing water bath is preferable. The soap probably only emulsifies the active principle, and thorough rinsing is necessary to avoid spreading the poison to other parts of the body.

The United States Public Health Service reports successful chemical protection against ivy poisoning by use of an oxydizing agent—sodium perborate prepared and used fresh as an ointment. Following is a formula given for the ointment: Cetyl alcohol, 35.1 percent; stearyl alcohol, 5.3; ceresin, 3.5; castor oil, 20.8; mineral oil, 21.9; Duponol WA pure, 1.7; sodium perborate, 10.0, and boric acid, 1.7 percent.

A more recent less oily formula recommended for both mechanical and chemical protection is given as follows: Shellac, 13 parts; isopropanol, 31; linseed oil, 4; titanium oxide, 12; sodium perborate, 13; talcum, 20; and carbitol, 3 parts.

Sometimes cottonseed oil, olive oil, or petrolatum is applied as a protective ointment when contamination is anticipated. Later the oil must be completely removed by repeated washing.

Clothing, wearing apparel, and tools that have been contaminated are often difficult to handle without further danger of poisoning. Some who are more or less immune to poisoning often contaminate others by carelessness. Contamination on automobile door handles or on a steering wheel after a trip to the woods often causes prolonged cases of poisoning of persons who have not been near the plants. One of the most effective ways for decontaminating articles is by thorough washing through several changes of strong soap and water. Contaminated clothing should not be worn again until thoroughly washed. It should not be washed with other clothes, and care should be taken to rinse thoroughly any implements used in washing.

Dogs and cats can be decontaminated in the same manner; precaution should be taken, however, to avoid being poisoned in doing the washing. It is likely that most "dry cleaning" processes will remove any contaminant; but there is always danger that clothing sent to commercial cleaners may cause poisoning to unsuspecting employees.

Certain prophylactic inoculations for the prevention of ivy poisoning have been developed and used with limited success; such treatment, however, should be administered by a physician only. The theory that eating a few leaves of these poisonous plants will confer immunity is without foundation; it should not be attempted even as an experiment, because very serious poisoning is likely to result.

TREATMENT FOR POISONING [1]

There seems to be no absolute quick cure for ivy poisoning for all individuals, even though many studies have been made to devise effective remedies. Remedies may be helpful in removing the poisonous principle or rendering it inactive and for giving some relief from the irritation. Mild poisoning usually subsides within a few days, but if the inflammation is severe or extensive a physician should be consulted. Self-treatment also has other dangers, as the symptoms of ivy poisoning may be confused with those of other conditions and harm may be done by improper treatment. In all cases the safest procedure is to consult a physician.

Some tried remedies are effective on certain individuals and ineffective on others. Sometimes a person will find one remedy effective and later, to his surprise, get very little relief from it. A large number of patent medicine remedies of doubtful value are commonly offered for sale. The following are more or less standard measures that have been advocated by different individuals and found helpful in certain cases.

[1] For a fuller description of treatments for poisoning see: UNITED STATES PUBLIC HEALTH SERVICE. IVY AND SUMAC POISONING. Pub. Health Rpts. Sup. 161 (rev.), 8 pp., 1943. For sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Price, 10 cents.

The United States Public Health Service recommends a 10 percent alcoholic solution of tannic acid applied as a lotion. It is stated that in using it the tops of the blisters should be rubbed off with sterile gauze saturated with the solution and that any large blisters should be opened with a sterile instrument. The treatment should be repeated three or four times at 6-hour intervals. A modified form of this treatment recommends vigorous rubbing of the lesions with alcohol-soaked gauze to remove the tops of blisters, followed by application of a 10 percent aqueous solution of tannic acid as a lotion. Any treatment involving opening of blisters and the application of alcohol is severe, and many cases requiring such treatment should be handled by physicians.

One of the oldest well-established remedies is a fresh solution of one 5-grain tablet of potassium permanganate dissolved in 1 quart of water; concentrations as much as 5 percent, however, have been used. The potassium permanganate is apparently active in neutralizing any poison that may remain on the surface of the skin and it has some therapeutic properties. This solution may be applied freely to the irritated or contaminated skin, but the skin should be rinsed with water a few minutes after the stronger solutions are used. Applications should be repeated every hour or two. The brown stain it causes on the skin will in time wear off, or it may be removed with lemon juice. It more or less permanently stains clothing.

Ferric chloride in combination with several other substances has been used effectively by many people. One of the most common formulas is that given under the discussion of precautions against poisoning (p. 22). To this formula 1 to 3 percent of phenol is frequently added to reduce the itching; however, not more than 1 percent of phenol should ever be used without the advice of a physician, on account of the danger of systemic absorption and poisoning. The solution should be freely applied to the irritated or contaminated skin every hour or two. Some instances of persistence of the brown discoloration of the skin have been reported. For this reason its use is limited, but for most individuals the discoloration completely disappears after a few days. Stain on clothing is usually permanent.

Photographer's hypo solution has been used with good results in many cases. This is a 10-percent solution of sodium thiosulfate in water. The irritated or contaminated skin should be bathed in it every hour or two. It does not stain skin or clothing.

A calamine lotion with the addition of about 2 percent of phenol is often used and in many cases is effective. Frequent applications are necessary. For some people it is effective in relieving the itching. The pink stain is not permanent.

It is better to leave inflamed areas exposed to the air rather than cover them with dressings. If poisoning is so severe that dressings appear necessary, a physician should be consulted before any home remedies are applied.

ERADICATION OF PLANTS

Poison-ivy [2] can be killed either by mechanical means, such as digging, or by applying chemical herbicides. The best modern herbicides are so deadly to plants that a single treatment kills all the leaves and 90 percent or more of the roots. This is the easiest and least dangerous way to destroy these poisonous pests. There are places, however, where chemicals cannot be used, as in hedges and shrubbery where the poison-ivy is closely mixed with the valuable plants. In such situations, hand-pulling is the only satisfactory method. At times also chemicals and spraying equipment are not available, and then the mattock, scythe, or plow must be resorted to. Even with these simple tools some timing and handling methods are better than others.

CHEMICAL WEED KILLERS

By using care poison-ivy can be destroyed with chemicals without danger of poisoning to the operator. Except in very heavy growth, one may stand at a distance from the plants and apply the herbicide without touching the leaves. Most chemicals are applied as a spray solution, and many sprayers can be equipped with extension nozzles 2 feet or more in length. The greatest danger of ivy poisoning occurs from careless handling of gloves, shoes, and clothing after finishing the work. Garments should be worn that can either be destroyed after use or washed thoroughly in hot soda solution and soapsuds.

The chemicals thus far found most satisfactory on poison-ivy are, in approximate order of effectiveness, ammonium sulfamate, 2,4-D (2,4-dichlorophenoxyacetic acid), ammonium thiocyanate, borax, carbon disulfide, coal-tar creosote oil, fuel oil and similar petroleum distillates, sodium chlorate, and sodium arsenite. Less effective chemicals include common salt, kerosene, gasoline, calcium cyanamide, ammonium sulfate, and iron sulfate.

Chemicals other than borax are best applied as a spray to the foliage. Borax is scattered dry on the soil around the plants. Any field or garden spray machine or even a sprinkling can is useful for applying the liquids, but a common knapsack sprayer holding about 2 gallons is convenient and does not waste the solution. Application should be as a fine spray under moderate pressure rather than a driving mist, since the object is to wet the leaves of the poison-ivy and avoid wetting the leaves of desirable plants.

Most chemicals used on poison-ivy are injurious to the foliage of all kinds of plants and must be applied with caution if the surrounding vegetation is valuable. During the early part of the growing season the leaves of the poisonous plants usually tend to stand conspicuously apart from those of adjacent plants and can be treated separately if sprayed with care. Later the leaves become intermingled and injury to adjacent species is unavoidable. Chemicals other than oil are not injurious to the thick bark of an old tree, and poison-ivy clinging to the trunk can be safely sprayed with them.

[2] For brevity, the single designation poison-ivy is used under this heading to apply equally to all poison-ivies and to poison sumac.

Chemical sprays can be used at any time when poison-ivy is in full leaf, June and July being perhaps the best months. Ordinarily treatments should begin not later than August 15, as poison-ivy then begins to go dormant and sprays are ineffective.

Best results are obtained both with sprays and with dry chemicals when the soil is moist but not wet at time of treatment. Borax can well be applied just before a rain, but sprayed chemicals are likely to be washed off if rain falls within 24 hours. One gallon of spray solution is sufficient to cover all the leaves on 1 square rod (272 square feet) of dense poison-ivy, or 2 to 4 square rods of a scattered stand.

Sprays give best results when applied in early morning or late afternoon when the air is cool and moist. Spraying in the middle of a dry, hot day is likely to be disappointing unless the plants are in deep shade.

No method of chemical eradication can be depended upon to kill all the plants in a stand of poison-ivy with one application. Three to four light retreatments made as soon as the new leaves are fully expanded are always necessary (1) to destroy plants missed the first time, (2) to treat new growth from the old roots, and (3) to destroy seedlings. At least three and sometimes four treatments at intervals of 2 to 8 weeks are necessary before all plants are dead. These follow-up treatments do not require much time or material, but neglect of them may easily lead to serious reinfestation.

Poison-ivy has an annoying habit of "playing possum." Plants believed dead sometimes revive after many months. Thus an area under treatment must be watched closely for at least a year if complete eradication is to be assured.

Dead foliage and stems remaining after the plants have been killed with chemicals are only slightly poisonous, but to avoid difficulty the dead stems should be cut off and burned.

Ammonium sulfamate.—This chemical, under a proprietory name, has come on the market recently as a weed killer and has proved especially useful against poison-ivy. Ammonium sulfamate is not dangerous to use under ordinary conditions, is not harmful to the soil, and is not flammable. It is slowly corrosive to metals, and spray equipment should be washed thoroughly with a solution of lime or soda immediately after use. Like salt, ammonium sulfamate absorbs moisture from the air and must be stored in a dry place.

Ammonium sulfamate is dissolved in water at the rate of 12 ounces per gallon and sprayed on the leaves until they are wet but not dripping. The foliage begins to wilt within 24 hours, but the action is slow, and a week or more may elapse before the leaves die. Some new growth may be expected after 4 to 8 weeks, and this should be sprayed as soon as the new leaves are fully expanded. Two or occasionally three such retreatments are needed before the kill is complete.

2,4-D (2,4-dichlorophenoxyacetic acid).—This chemical, under the abbreviated name 2,4-D, is a recent addition to the list of effective weed killers and may become an important weapon for use against poison-ivy. It should not be confused with DDT or DD, two other new agricultural chemicals, the first an insecticide and the second a soil fumigant.

The chemical 2,4-D is one of the so-called "plant hormones," or "growth regulators." In minute quantities it stimulates some of the plant functions, but in larger dosage it is toxic. A solution sprayed thoroughly on poison-ivy foliage between May 15 and July 1 damages or kills the leaves and may kill the roots. In this concentration 2,4-D is not harmful to animal life, is not flammable, and is not corrosive to spray machinery, but if the sprayer is used also for insecticides and fungicides it must be washed very thoroughly with a hot soap or washing powder solution to remove the slightest trace of 2,4-D.

Many brands of 2,4-D weed killer are on the market, some in liquid and some in dry form. The content of 2,4-D in these preparations ranges from less than 10 percent to more than 90 percent. To prepare the standard spray solution used to kill dandelion and similar weeds, these compounds are diluted with water according to directions on the package. Poison-ivy requires a spray solution approximately twice as strong as that needed for dandelions. Consequently, in using commercial 2,4-D weed killers for poison-ivy, twice as much of the compound must be used as is indicated for dandelions.

Ammonium thiocyanate.—This byproduct of the coal-gas industry is one of the newer herbicides. The crude commercial chemical is a pink or reddish salt, very soluble in water. It does not keep well, tends to disintegrate into a red, sludgy mass, and is difficult and disagreeable to handle. A purer form in clean white crystals is available and is well worth the slight extra cost. In either form ammonium thiocyanate is injurious to the skin and to leather articles, and in time it corrodes metals. The spray solution is made by dissolving 1 to 1½ pounds of ammonium thiocyanate in 1 gallon of water.

Most annual plants and some perennials are killed by a single application of ammonium thiocyanate. Poison-ivy usually requires three or four treatments. Ammonium thiocyanate has a high content of nitrogen, much of which remains in the soil and eventually becomes a fertilizer. Thus an area treated with this chemical is likely to produce a profuse growth of annual weeds a month or two after treatment.

Borax.—Common borax scattered on the soil is deadly to the roots of many plants. Spread dry at the rate of 10 to 15 pounds per square rod, it kills poison-ivy slowly over a period of 6 to 8 weeks. A second somewhat lighter treatment 3 to 5 months later is usually necessary to kill all plants completely.

Borax is easy to handle, nonpoisonous, and nonflammable, readily obtainable, and not expensive. It is one of the best chemicals to use around stone walls, rocky ledges, fences, and other inaccessible places.

Plants differ greatly in their resistance to borax. Some species, as Virginia creeper and deep-rooted trees, do not seem to be injured, but others, notably dogwood, are very sensitive to it. Until more complete information is available as to the effect of borax on other plants, it should be employed on poison-ivy only where possible damage to surrounding vegetation is not objectionable.

Carbon disulfide.—The fumes of this pungent, volatile liquid are very poisonous to plants, and the chemical is widely used in the West to kill deep-rooted perennial weeds. When poison-oak, particularly, is growing in a mixture with wild morning-glory (bindweed) or similar noxious weeds, both plants may often be killed at one operation by treating the soil with carbon disulfide. Holes ordinarily 6 inches deep and 18 inches apart in all directions are punched in the soil with a 1-inch iron bar, and 2 ounces of carbon disulfide are poured in each hole. The openings are closed immediately with a wooden club. This dosage equals 20 pounds of the chemical per square rod. Carbon disulfide is likely to be less effective on shallow-rooted than on deep-rooted plants and is therefore of limited value against poison-ivy, which is surface-rooted.

Carbon disulfide is poisonous, and as it is also highly flammable it should be handled as carefully as gasoline.

Coal-tar creosote oil.—In the fractional distillation of coal, many oils and oillike substances are obtained, some of which are very toxic to plants. The most common and usually the cheapest is the creosote used for wood preservation. This substance has great penetrating power and is an excellent herbicide on woody plants like poison-ivy. Ordinarily creosote oil is too expensive to use alone and is therefore mixed with some kind of petroleum oil. A mixture of 75 percent fuel oil and 25 percent creosote oil is almost as effective as straight creosote and is made at one-third the cost. Two applications of this mixture at an interval of about 6 weeks usually kill a high percentage of poison-ivy. Creosote is not selective and kills all plants alike.

Fuel oil (Diesel and similar oils).—Crude petroleum is refined into many kinds of oil, and those corresponding to fuel oil, Diesel oil, stovetop oil, and orchard-heating oil are more injurious to plants than crude oil itself or the higher distillates, such as gasoline and kerosene. Fuel oils are widely used for destroying vegetation, particularly by highway departments in States having oil resources. When sprayed on poison-ivy, fuel oil brings about a slow but fairly sure death of the plants. Two or three applications may be necessary before the roots are killed. Fuel oil, like creosote, must be used with care around valuable trees and shrubs because it penetrates the bark and kills or injures all species. As used for poison-ivy spraying there is no injury to the soil. The oil-soaked vegetation is flammable.

Sodium chlorate.—Sodium chlorate is the standard herbicide for killing deep-rooted perennial weeds like bindweed, but when used as a spray, it is a dangerous fire hazard, and when applied dry, it sterilizes the soil for 2 to 4 years. Where sterilization of the soil is desirable or not objectionable, one application of the dry chemical, evenly at the rate of 3 to 4 pounds per square rod, is sufficient for a complete kill.

If used as a foliage spray on poison-ivy, the chemical is dissolved in water at the rate of 8 to 12 ounces per gallon. The leaves are killed within a few hours, but the plants are likely to make a strong new growth and may require as many as six treatments before they cease to produce new leaves.

Sodium chlorate mixed with wood, cloth, or other organic materials is highly combustible and easily ignited. Shoes and clothing on which chlorate solution has been allowed to dry are especially dangerous, for they will ignite and burn with explosive fury. Contaminated clothing should be kept wet until thoroughly washed in a large volume of water. Chlorate should be stored only in original metal containers, as any admixture of chlorate, wet or dry, with straw, wood, dust, cloth, or leather has properties similar to those of gunpowder or matches.

Sodium arsenite.—Sodium arsenite is one of the most powerful plant poisons known and is widely used for sterilizing soil on railroads, roadways, and other places where no vegetation of any kind is desired. It is relatively inexpensive. In normal times sodium arsenite is obtainable in both powder and liquid form. In weak solution (4 to 6 ounces per gallon of water) the chemical can be used as a spray to destroy poison-ivy. Like sodium chlorate spray, it kills the leaves but not the roots, and five or six treatments may be required. The solution kills the leaves of all plants impartially and will also kill the young tender bark of shrubs and trees. This may be either an advantage or a disadvantage, depending upon circumstances.

All compounds containing arsenic are deadly poisons if taken internally. Arsenical sprays and chemicals should not be used where there is any possibility that materials sprayed with them will be eaten by animals or man. In some communities special permission must be obtained before arsenical weed killers may be used.

ERADICATION BY MECHANICAL MEANS

Poison-ivy can be grubbed out by hand quite readily early in spring and late in fall. When the ground is soft after rains the roots come out in long pieces. Grubbing when the soil is dry and hard is almost futile, since the roots break off in the ground, leaving large pieces that later sprout vigorously. Eradication by grubbing is permanent if well done. Because of his close contact with the plants, the person doing the grubbing should have a high degree of immunity to ivy-poisoning. Many people are not so immune as they believe, and it is common sense to wear leather gloves with gauntlets and a shirt with long sleeves. If care is taken to prevent the poison-ivy from touching the face, and if the clothes, including the gloves, are burned or thoroughly washed after use, severe poisoning may be avoided.

Poison-ivy vines climbing on trees should be severed at the base and as much of the vine as possible pulled away from the tree. Often the roots of the tree and weed are so intertwined that grubbing is impossible without injury to the tree. Close mowing of the poison-ivy shoots at frequent intervals is the only remedy. Roots and stems removed in grubbing should be burned or otherwise destroyed, since the dry material is almost as poisonous as the fresh. Care must be taken to keep out of the smoke.

Old plants of poison-ivy produce an abundance of seeds, and these are freely disseminated, especially by birds. A poison-ivy seedling 2 months old usually has a root that one mowing will not kill. Seedling plants at the end of the first year have well-established underground runners that only grubbing or chemicals will kill. Seedlings are a constant threat as long as old poison-ivy is in the neighborhood.

Plowing is of little value in combating poison-ivy unless followed by persistent stirring with a cultivator or harrow, to keep all roots loosened from the soil. Otherwise plowing merely propagates the weed.

Mowing with a scythe or sickle is a common method of attacking poison-ivy, but it has little effect on the roots unless frequently repeated. The number of cuttings required to kill depends upon the age of the plants and the size of the roots, but is seldom less than four. New shoots should be cut as soon as the first leaf on each stem is full size. Cutting either earlier or later delays eradication.

Weed burners are implements resembling oversize blowtorches. Two types are manufactured, one producing a short, hot, blue flame and the other a long smoky-yellow flame. Both are useful for destroying foliage. Neither is likely to kill perennial plants like poison-ivy at one operation, even though the flame is held on the weeds for a minute or more until leaves and stems are completely incinerated. The roots are not injured by this, and new leafy shoots soon develop. A better plan is to "sear" the plants by passing the flame slowly over the vines just long enough to sear or wilt the leaves, but not long enough to burn them. The roots appear to be injured more by "searing" than completely burning the leaves, and the operation is quicker and cheaper. Three to four searings when the leaves reach full size usually kill the roots.

— U. S. GOVERNMENT PRINTING OFFICE: 1946

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 10 cents